

**A Critical Appraisal of “Effectiveness of a Home Exercise Program
in Combination with Ultrasound Therapy for Temporomandibular
Joint Disorders”**

By

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Abstract

As clinicians/future clinicians we are constantly striving to provide evidence based practices for our patients. One way we can provide such care is by use of critical appraisal which allows us to weed out useful and non-useful research. Critical appraisals of literature is key to determining if certain treatments would be valid and effective for treating your patient's condition. In this critical appraisal I have asked the question of- Is Ultrasound therapy, when coupled with PT, an effective treatment for reducing TMJ pain? This appraisal consists of all the pros and cons of the introduction, methods, results, and discussion of the study in the results section. In the methods it is discussed how I found the article using a PubMed search. The article is from the Journal of Physical Therapy Science from the year 2014. The study took place in Turkey with the authors being medical staff at several different hospitals in Turkey. From my appraisal discussion I have concluded that I can't quite implement this on future patients quite yet. There are too many unknown variables in this research for me to back this but the data is very promising.

Key words

Ultrasound Therapy, TMJ Disorder, Blind Study

Introduction

Physical therapists wonder every day if they are giving their patients the best care possible. There is always new and innovative research coming out about treatments for patients and it's our job to make sure we can critically appraise these studies with enough scrutiny that we can determine if it's sound enough to try it out ourselves. I have always been curious about TMJ disorders and what the best methods are to treat them. I heard Ultrasound therapy is sometimes used to treat TMJ pain. So I came up with a clinical question- Is Ultrasound therapy, when coupled with PT, an effective treatment for reducing TMJ pain?

Methods

The data base I used was PubMed. My key words were: TMJ Disorder Pain and Ultrasound Therapy. The limit I used was "Clinical Trial" so that I could separate the actual performed research from summarizations of research. At this point I was able to complete my findings and to not have to narrow down full texts because they all were full texts. The inclusions in the articles I chose is the subjects all have TMJ disorder/pain. The articles contain at least one test group being tested with ultrasound. This gave me 36 total hits and narrowed it down to about 20.

This article came from the Journal of Physical Therapy Science, the 26th volume of 2014. The study took place in Turkey with the authors being from several different medical facilities. The authors include Mehmet Ucar MD, Umit Sarp, Irfan Koca, Selma Eroglu, Alparslan Yetisgin, Ahmet Tutoglu, Ahmet Boyaci. I choose this article because from the surface it looks like a good study but it seems there are some key components missing. The patients are said to

be diagnosed but we do not know who diagnosed them. We also do not know who was working with the patients and if it was the same person with each patient every time. Were these people with them during HE or was it an honor system? We also have no knowledge of the patients being blind to which group they were in or the people doing baseline/outcome measures. Four patients from the HE group did not attend follow ups which makes me wonder if they knew they were in the control group. We don't know how reliable VAS or MMO is and the cited article states that pain indexes aren't as reliable.

Results

Summary of the study

This research project wants to see if combining ultrasound therapy to their regular home exercise program will help reduce the patients pain compared to just doing the home exercise program alone. They were randomly assigned to either HE or HE+US. Each group did baseline assessments using a pain visual analog scale(0-100mm) and pain free mouth opening. Their outcome measurements were performed 2 weeks after the completion of therapy. The results show us that both the HE and HE+US had decreases in their VAS scores but the HE+US group had a much greater decrease. Both groups also had increases in their MMO but again the HE+US group had a greater increase in that as well. This study shows that both HE and HE+US will decrease their pain and be an effective treatment, but the addition of US will yield greater results.

Appraisal of the study introduction

The introduction is clean cut and gets to the point quickly. It provides enough background for the reader before leading into the methods. They covered most of their critical variables in the introduction. There were several good references used to back up their information.

There are some weaknesses in the introduction, mainly from the literature, not all of their references are from a primary source/credible journal. Some of the journals were in their earlier years of publication (under 10 years). These articles range from 1991-2013, so a little older in year. The article was submitted and accepted in 2014. So some of the citations they used were new at the time. The 1st source is a secondary source from a book. I have had a hard time finding the article in the 2nd citation but have requested the full text. The 4th citation is a literature review and if I am reading it right, it says it's from an opinion journal. The 8th source is an article on how we should define (criteria) TMD. The 11th source is a systematic review. Other than that, the other articles look great. Lastly, they left out information on HE programs in the introduction.

Appraisal of the study methods

There are a few strengths of the methods of this research, one of which is that they use a longitudinal quasi-experimental design. They only had patients with TMJ disorders in this study. For those patients who dropped out for unknown reasons they made sure to properly exclude the data so that it would not skew the results. They used a between-subjects design with a control group and an experimental group and there were no significant differences in sociodemographic, clinical, or prognostic characteristics. Each group got the same treatment of HE and the experimental group got the addition of US.

There are several weaknesses of the methods, one of the big concerns being that we have absolutely no idea if anyone was blinded in the study. They do not tell us if the people enrolling the subjects, the subjects, or the clinician/assessors were blind to the group assignments. The methods could be closely replicated but may be off because it doesn't give enough detail of the home exercises. VAS was described in enough detail but MMO is not as detailed. In the methods it doesn't say how they measured the distance of the pain free mouth opening. It is seen later on a table that they used mm but not what tool. They do not state the measures reliability or validity but cite an article. The article does not show full text and just an abstract. The abstract still doesn't really state reliability or validity either. It mentions pain scales may not be very reliable. Lastly, some subjects dropped out of the study and we have no information as to why they left which makes us question why.

Appraisal of the study results

The results section for my article is extremely short but to the point. It is written and organized clearly. It follows the same order as the rest of the article. The results section answers the research question and each aspect of the hypothesis is answered. The authors reported all the outcome measures by telling us if it was significant or not. They provide a chart of their numbers. The tables are clear and easy to read. They make it clear of what the threshold for p-value.

There are only a few minor weaknesses of this results. The first weakness is they don't mention a CI. They also do not mention MCID or NNT for this study. I think it would be useful for them to explain why they used median values instead of mean values for their results. The use of median in this case is good for the data because it helps get rid of the extreme outliers that may skew the results.

Appraisal of the study discussion

The discussion section of this study have several strengths one of which they used several sources that were recent for the time of the study. They cite a couple of sources in this section that reveal that modalities in conjunction with PT seems to work better. The conclusions are reflective of their results and compare them with other research. I don't believe they over conclude their findings. They suggest further longitudinal studies that would show the long term effects of ultrasound. This does make sense, I would like to see how a longer treatment plan might have better result or a bigger gap between HE and HE+US groups, but not too long so that there could be external influencing factors. The author does mention how this study could be clinically significant for patients. The results do show that this pairing has good potential to help these patients if applied.

Lastly, there are a few weaknesses in the discussion as well. They don't really further indicate the meaning of their findings, they mostly repeat themselves about the results but it adds that improvement happened in both groups but more in the HE+US group. For the time period the study was done there were a few current but some almost 20 years old. All of the sources are good except source #1 which is from a book and the 11th source is a systematic review. No limitations were recognized or mentioned in the discussion. I believe some limitations of this study is the amount of control and blindness. They may want to do a larger sample size too.

Discussion

This study has given me insight on how the addition of ultrasound therapy to PT can be possibly more beneficial to patients than just PT alone. The results showed HE+US being an

effective treatment for patients with TMJ pain. This study's results will be useful for PTs who are treating these patients that are wanting more results and relief for them. It will hopefully bring about more questions and research about this subject. From the results of this study it would indicate that it answers my question about US being effective in combination, but it has left me with other additional questions.

As of now I am not backing this research 100%. I would like more studies to be done, especially more clean cut and controlled than the one I have reviewed. There are a few risks with Ultrasound Therapy which mostly cause tissue damage. These risks can be minimized by having a well-trained clinician perform US. The benefit of this therapy is, if the research is correct, that it will decrease pain significantly more in combination with HE than HE alone. These benefits will certainly outweigh the risks of using US in treating TMJ pain.

I currently do not have enough confidence in this article to start using this treatment on future patients. I have no way of knowing if the data given is skewed in any way due to it not being blinded. I would however have interest in doing research of my own, possibly replicating this study with more control in the methods.

In conclusion, this article is very promising research. The data they collected shows that the addition of US to HE will help patients so much more in reducing pain than HE alone. That statement alone is a very big deal for these patients. However, seeing how there is still very little to no research on this subject, I am still a little skeptical. I would like to see this study redone with possibly a double blind added into it as well as the validity and reliability of the outcome measures. The addition of the double blind would better assure these results are not skewed.